Smart
Word-Searching
System (SWSS)
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Abstract

All undergraduate students of the Faculty of Computer Science and Information Technology (FSKTM), University of Malaya are required to carry out a Final Year Thesis Project in computer or information technology related of preparation in real working environment.

I assigned to do research in Smart Words-Searching System as it provided more efficient way for user in daily working environment especially for those text-interface employee who have to face the monitor for text edit or typing.

The Smart Words-Searching System was developed using Visual Basic as the main tools of development, where it was used to build interface and function need in the system. Visual Basic, famous in creating sophisticated professional application, is an easy-to-use application and it can be integrated with most of the Microsoft tools such as Microsoft Access, which is used as a database to store all data and information required for the system.

The methodology part have been decided to use the most widely understand that the WaterFall model. The five steps easy to implement and maintenance and it is effective against any product implementation.

The literature review makes use of some similar products or systems in the market. For the global usage, like the Ms word of the Microsoft cooperation and search engine in the World Wide Web.

The search can be include Boolean search functions for users to search for the texts or phrases they need to modify or something else.

Acknowledgement

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Secondly, I would like to thank Cik Nor Aniza as my moderator for giving me lots of advices for helping in developing the system.

Thirdly, I would like to thank the FSKTM of preparing a place name Documentation room that locate various of Thesis project documentation for the purpose of reference by the students.

Fourthly, I would like to take this opportunity to express my appreciation to other lecturers in FSKTM for their advice and guidance for my thesis project, as it would be impossible to precede a project without background knowledge.

Finally, I want to thank all my friends that giving me guidance, the utmost support and the most important, motivation and encouragement in putting this project a success.

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Introduction

1.1 Introduction to SWSS

Nowadays, to expose the real working environment in a company or institute, new kinds of technology have been use to ensure everything going on time which refers to faster and better performance .For this purpose, the new technology have been invented ----computer system. Everything can be done using the computer. For example, one can type his or her documents using the Microsoft Word or notepad or other software, which are provided for the computer user for the purpose of created text base document.

The documents create from the computer software are in better interface, systematic, tidy, and easy to read. But somehow everything in nature has its own problem. The text which been create may also have some error like spelling error, paragraph error, word font error and etc. In order to correct the error, one just has to rude off the error words and rewrites them, of cause only for short text files. For the long text files that can be hundred pages, it is difficult to correct the error one by one. For this purpose, the Smart-Word Searching System has been introducing.

The Smart-Word Searching System is the system to find the words you are looking for no matter how long of text files is as long as it is in text form. After searching for the word, you can do what ever you want for the word like copy, delete, change, correct, replace and etc. It is much like the "Find" function in Ms Word but it has more function like count the number the words or characters in few pages. Besides, it could also search for the files and save them with various names in different directory.

As a whole, a person only has to type a word or a character to find the word he or she is looking for. That all. Easy isn't it

1.2 Objective

For easier uses of every software among those that sell in market, almost all the text editor software has such words-searching system.

The main objective of this software is to provide the easier way of using their software. It is because they included the words-searching system which objective is to save the time to find the words or characters by users.

In the mean time, user do not need to find the same words or characters every time to edit them, what they do is just find them one time and edit the same words in the whole passage in just a single click.

The procedure is easy even for a primary student, just click it and it doesn't waste a lot of energy and time.

For the uses of Smart Words-Searching System, it provided easy job for the producer and the book or article author, as the production will be increase in no time. The easier use of the system almost make no pressure to everyone that may be also the reason which come out lots of philosophers from time to time.

If user wants to search whether the files they are looking for exist in the computer, the search function can also be used. There are only simple procedures to follow to complete the searching even the user below ages also will know how to use the program—a single button press to complete the whole process.

1.3 Scope

The Smart Words-Searching System enable user for easier way of solving texts error. In order to make the system running without any grammar error, the system must be improve from time to time. But before that, the system must include the most basic design and operation. The scoops of are:

- A system structure must be plan and design for easy refers.
- The design interface must be easy to understand by the user.
- A system must be design by the system builder for
    1. Easier words, filenames and characters searching.
    2. Writing new article part

3. Document producing part
4. Search for existing document

- Easy way of searching by typing keywords
- Easy to change and edit words like replace and error correction
- The text will be able to open, save and etc
- Have some function like spelling check which include in most of the text editor
- Include some easy-in-use format like page format, font format, font size, paragraph format and etc
- Easy to load, save for files and etc

1.4 Tools to use

Before development a system, there are few things to be prepared to meet the demands of the system. Not just the system, which I am going to develop, every system no matter large or tiny also must some system tools to be used. For my system, the requirement tools can be stated as follow:

1.4.1 Hardware requirement

- PC with
- RAM
- Hard disc space for storages
- Monitor
- Printer
- Keyboard
- Mouse
- Diskettes

1.4.2 Software requirement

- Operating system
- Programming Language
- Some other graphics and texts writing software.

1.5 Expect Outcome

After developing the system, we must try to implement the system in many ways. The questions are what is the benefit it brought along? What are the major uses of the system? And so on.

As a result, we must make sure the outcome will be able to meet the user's need. For this SWSS, there are few situation should be expected:

- User must be able to search for words and filenames with several searching methods.
- The text will be able to save with different filenames and author's name.
- The text should be able to open for edit.
- The count function that will only count the exactly word been key in.
- User can write the text include any type of strings and fonts.
- The interface should be easy to understand for any user.

The system should have some other

Chapter 2

Literature Review

2.1 Overview

What is Smart Word-Searching System?
Where can I find such system?
When can I use the system?
Why do I use the system?
How do I use such system?

Above are the questions that I ask myself during research some details about the system. As for the time been, the operation of this system will be much same as the search engine on the web like "Yahoo", "Altavista", "Inforseek" and others. But as for whole, they are not exactly the same. The search engines on the web include multiple multimedia functions while the Smart Word-Searching System is only a part of those systems.

. Even it is much like the search engine, but it has its own benefit in some ways. As compare to the search engine, below are the results.

- Search words or phases in text documents.
- Search and edit or replace the words or phases with grammar error.
- Count character, words or phases.
- Open text documents for editing.
- Save the changes
- Go to line "x"
- Search the location of the files
- Grammar checking and etc

As the above results, you will find that it is more like the "Find" function in Ms Word in Microsoft Office environment. I can't say that it is wrong as the system is definitely base on the "Find" function but I also include some other functions.

You can say that it has its own weakness, so do I and below are the results even before the building of the system. They are:

- Only works in text documents environment.
- Just a few functions in text editing.
- Not a good interface.
- Small system compare to multiple uses software such as Microsoft Word.

So as a conclusion, although it is not the same as Microsoft Word that build in a lot of functions, it is a small system that will help you in editing your text documents error. User can referred to the user manual about the operation of the system to understand the procedures of searching method.

2.2 Purpose of Literature Review

A Literature Review of a project is important as it place the project in the content of others which might have similar characteristic as follow:

1. It offers the development of using the best way to access and analysis information regarding their research topic.
2. There is no use of reinventing the wheel that has already been invented. The development can rather focus in learning the existing and modifying or enhance it into a more powerful feature for project.
3. Another important purpose is to sufficiently equip the development with some knowledge of the strength and limitation of several development tools. This can help the developer to use the right tools when develop the system.
4. It also helps the developer to recognizing relevant information and synthesizes and evaluates it according to the guiding concept.
5. It helps user to develop their information and critical approach skill.

2.3 Approach of Literature Review

In the hardest sense, a system is a collection of elements interacting together to accomplish some purpose and system around us. Different system can be developed in different approaches using different tools. Before develop a system, a lot of research has to be carried out to gather information about the system itself, the procedures as well as

the methodology involved in development the system. All these information can be obtained from various sources.

Each sources will provides different information depending on the analysis of the developer himself. It depends on the ability of the developer to analysis the information to extract the most useful information out of it.

In the development of Smart Word-Searching System, numerous information likes articles and books were used as a guided to gain information on how to develop the project. A package developed for the "Find" function in Microsoft Word was used as a basic to develop a similar system.

Most of the findings for this project are gathered regarding the resource, which will be described at the next part of this section. The results of this research in Literature Review have set a foreground for the development of this system.

2.4 Technique Conducting Literature Review

Information is essential to do a good research or analysis. For this project, several technique have been taken to seek information their technique are as follow:

- Refer to reference books
  A lot of books, journal can be found in workshops or libraries. Some of the books have reference about the methodology and system requirement.

- Searching information on web sites
  Internet is the main sources of information. Relevant information is analysis on the web. There are a lot of information about the comparison of such system development can be found on web sites.

- Do analysis on the pass year thesis
  Pass year thesis of documentation have been studied in order to identify any potential mistakes and gain skill in software development.

- Reference to magazine

  Reference to the latest magazine such as PC magazine and some Microsoft development magazine is also the technique to gain the latest information for the system development.

- Discussion with friends and lecturer

  Useful advices have been given for each section meeting with my lecturer and friends who have computer software development knowledge. It is a useful way in error correction and act as reminder when carried out the system development process.

- Similar system

  Look for the systems that have most of the same operation as the system that is going to build as references

- Conducting interview and survey

  Interview and survey have been conducted with various people like system developers, system administrators, and some other computer based background peoples to find out more about the system and also potential to improve the system.

2.5 Why use Methodology

As we have seen for the benefit of every methodologies, each have their own procedure in success the project which been developed. As a part of that, we will find that each of them almost have the following:

- The model is easy to understand
- The model is easy to implement
- The operation can go front and back if any problem
- Time taken can be expect during each step
- Cost spent can be expect during each step
- Schedule can be made according to the model

By the way, the following complaints from the user are typical:

- Software contain bugs
  --Always hang
- Doesn't meet the need of the user
  --Lack proper system analysis
- Software run slowly causing delays
  --Selecting the wrong type of algorithm
- Difficult to understand the interface
  --Poor code design
- Software costly
  --Amount of resource to develop is too high

The above is symptoms of imperfect software development and management. Some of this will affect the normal works of the software and the user. For the solution, a lot of improvements have to be carried out.

2.6 Methodology chosen

Most of the systems designed have their own methodology for the purpose of succeeding their design. The methodology use as a reference step-by-step preparation for understanding "What should do next".

There are few kinds of methodology included the following:

- WaterFall Model
- System Development Life Cycle (SDLC)
- Prototyping

Many people to develop their project have used the above methodologies. In order to make their project success in no time, each of them have their own reason in choosing either one methodology that state above. Basically, each of them has their own step and benefit in developed their project, which as follow:

2.6.1. WaterFall Model

This methodology can be dividing into five major steps, that each of them has their function as follow:

i. Requirement Specification and Analysis
ii. System Designed
iii. System Implementation
iv. System Testing
v. Operation and Maintenance

The diagram is show in the next page.

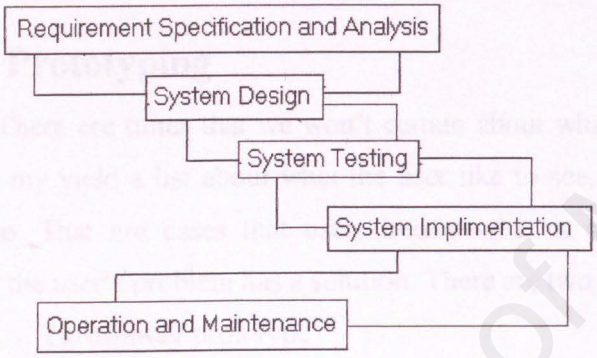


Figure 1: WaterFall Model

2.6.2. System Development Life Cycle (SDLC)

There are seven step or phase that made up the SDLC. Although each phases discretely, it is never accomplish as a separate step. Instead, several actions can occur simultaneously, and action may be repeated. All the seven phases are state as follow:

i. Identify problem, opportunity and objective
ii. Determining information request
iii. Analyzing system needs
iv. Designing the recommended system
v. Developing and documenting software
vi. Testing and maintenance the system
vii. Implementing and evaluate the system

The diagram of SDLC is show below.

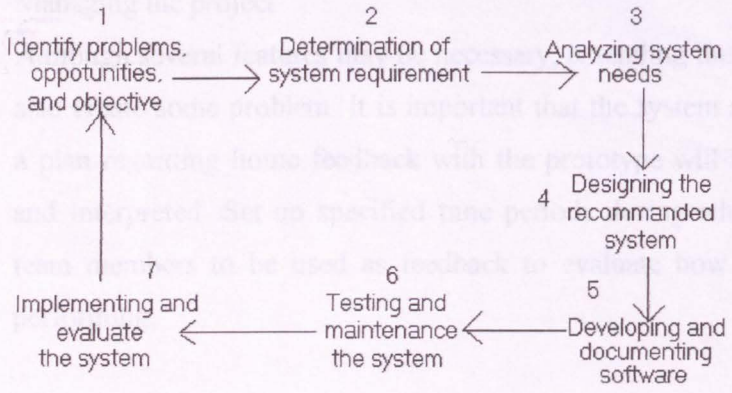


Figure 2: SDLC

2.6.3. Prototyping

There are times that we won't certain about what exactly we need. The request analysis my yield a list about what the user like to see, but it is not clear whether it is complete. That are cases that users knows what is needed, but we are not certain whether the user's problem has a solution. There are two approaches to prototyping.

i. Throwaway prototype

A throwaway prototype is software develop to learn more about the problem or explore the possible solution. It is exploratory and not intended to be used as an actual part of the delivery software.

ii. Evolutionary prototype

An evolutionary prototype is developing to learn more about existing problem and form the basic for some of the delivery software. For example several evolutionary prototypes can be built to let the user, who are not certain about what they want, to choose the preferable option. Once the interface is chosen, the prototype can be developed into the actual interface and delivered with the rest of the product.

2.6.3.1 Disadvantage of Prototyping

- Managing the project

  Although several features may be necessary, extending the prototype indefinitely also create some problem. It is important that the system analyst team came out a plan regarding home feedback with the prototype will be collected, analyzed and interpreted. Set up specified time periods during which decision make by team members to be used as feedback to evaluate how well the prototype is performing.

- Adopting an incomplete system as complete

  A second disadvantage is that if a system is needed badly and welcome readily, the prototype may be accepted in its unfinished state, and prepare to service as appending way to short circuit a lot of output effort, it works to the business and team's disadvantaged.

As for myself, I use the Methodology, which name as 'WaterFall Model'. This methodology that I use in Smart Words-Searching System can be dividing into five major steps that have step above, which each of them have their function, procedure and even own preparation. More details will discuss in the next chapter.

2.7 Comparison with Existing System

2.7.1 Search Engine

As for the research before, I have mention that Smart Words-Searching System is much like some search engine on the web sites. So for more understand about the Smart Word-Searching System, lets compare it to few search engine like "Altavista", "Inforseek" and "Lycos".

2.7.1.1 Altavista

Altavista is the search engine that you can find anything on the web for just type the words about the things you want to find. Basically, you can find something by typing two kinds of words and they are keywords and phases.

- Keywords

  Find something with typing combination of words, characters and numbers or symbols in the search box.

- Phases

Find something with typing words and number which separate by some Boolean symbols like "+", "-", "&", "Not", "_", "/" and etc.

- Others

Find with different uppercase and lowercase characters, wild card symbols, the exactly file name, web page URL, different language etc.

2.7.1.2 Inforseek

In Inforseek, the way to find information much likes Altavista that has mention above. Anyway every search engine has its own way in operation. For the time been, there are few ways in searching for information and the results almost satisfied for the user.

- Find with uppercase and lowercase character because it is case sensitive search engine.
- Find with sentences.
- Search with sign " " for the important phases.
- Search with Boolean symbols.
- Search with title.
- Search with IP address or URL for the require web page.
- Find information with typing a|b which means case a and important in case b.

2.7.1.3 Lycos

Lycos is the search engine that suitable in searching for articles on the web site. The searching for text documents is its main purpose compare to image and others information searching. For the case in searching, the way in using almost same as others search engine.

- Search with words and phases.
- Search with exceptional words.

- Search with symbols and numbers.
- Search with title or subject.
- Advanced search, which include more details about the subject you want to search.
- Search with URL.

As a conclusion, every search engine almost has the same uses with only a few different steps in searching for information. If compare to Smart Words-Searching System, the search engine have more operation as the Smart Words-Searching System only limited in editing text document and its input box can only feed characters, words, phases, and numbers.

2.7.2 "Find" Function in Microsoft word

As in Microsoft Word, there is a function under the "Edit" button at the menu bar, the "Find" function that almost have the similar operation as SWSS. Users can key in the words in the "Find what:" text box to search for the words they wish to find in the text and then press "Find Next" button to get the location words.

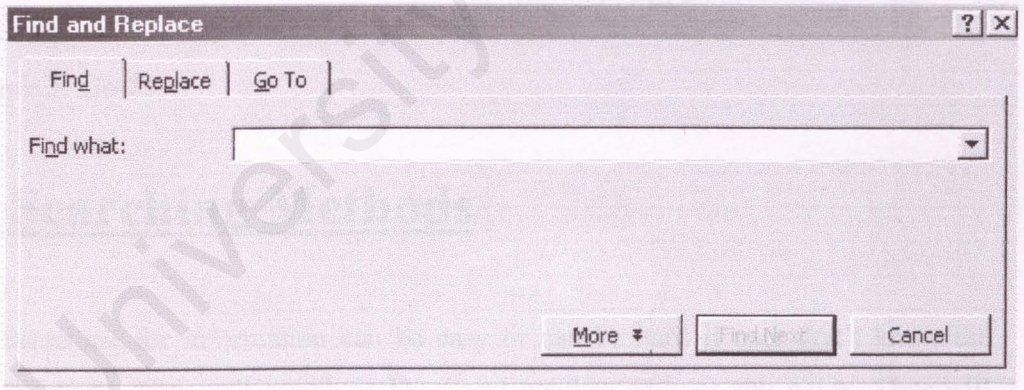


Figure 3: Find

Besides, they can replace the existing words with new words, which exist in text, by key in the existing words in the "Find what:" text box and key in the new words in the "Replace with" box to replaces the words.

Figure 4: Replace

Other addition function like "Go To" that will lead users to the places that user choose in the "Goto what:" list box.

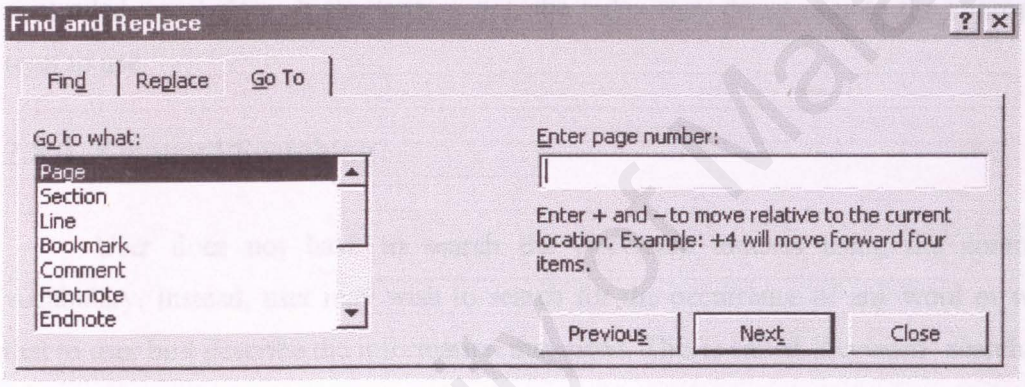


Figure 5: Go To

2.8 Searching Methods

Searching for information can be easy or can be hard if user don't know the exactly methods. They will search in blind and confuse without any guide. Thus will make them difficult to use the system in text editing.

There is several search technique that will provide and help user in some way of searching. The methods state below is mostly in use today. User will face fewer problems if they remember these principles:

2.8.1. Controlled Vocabulary or Subject Searching

"Controlled vocabulary" refers to the use of standard terms to describe the contents of the articles in the database of a computer index. Librarians often refer to these standard terms as "subject headings," although the computerized indexes may call them "descriptors." Each computerized index in the KU Libraries has a specific controlled vocabulary that is all its own. Searching the index using that vocabulary allows user to retrieve all the records in the database on a particular topic using a single search term.

There are a number of ways to access this controlled terminology. Some indexes may have an online list of subject headings, sometimes called a "thesaurus." If the index user are using has a thesaurus, select it, then type in the search term and see if it is in the controlled vocabulary. If the term is not, the index may direct user to the appropriate term to use.

2.8.2. Keyword Searching

User does not have to search the electronic indexes using the controlled vocabulary. Instead, user may wish to search for the occurrence of any word or words that to user best describe the information they need. This is called "keyword" searching.

This method allows user to search for any word anywhere in a citation or article. Keyword searching is probably the most common method used in searching the wide variety of different electronic indexes and databases available in the KU Libraries.

2.8.3. Boolean Searching

A research topic often involves more than a single concept. For example, if user are working on a paper dealing with the ethical implications of employer access to private e-mail correspondence of employees in large, multinational corporations user have a number of different concepts: ethics, employer vs. employee rights, privacy, electronic mail, and multinational corporations. A simple subject or keyword search generally allows user to search for one concept at a time. What user may wish to do is a

single search that combines all of these concepts in one search statement, hopefully pulling up articles that deal specifically with user paper's topic.

This is where "Boolean" searching comes in. Boolean searching allows user to combine many different concepts in a single search using the "operators" *and*, *or*, and *not* to tie user's search terms together. See the "Boolean Searching: An Introduction" guide for examples of how Boolean searching works.

2.8.4. Relevance Searching

Relevance searching allows user to enter multiple search terms and to indicate the importance with a symbol. Symbols are usually + (items must contain a term with this symbol) or - (items must not contain a term with this symbol). The system will search all fields of all records for user's term or terms and rank the results using a relevancy algorithm.

2.8.5. Truncation and Wild Cards

Most electronic indexes allow the use of "truncation" and "wild card characters." These characters are usually the question mark "?", the exclamation mark "!", or the asterisk "*". Each database may use a different character. Check the online help or ask for assistance at the Reference Desk if users are not certain which character to use.

"Truncation" allows user to search for a root word and all of its various endings. For example, a search for televis? would retrieve records with the words television, televisions, televise, televised, televising, televisual, etc.

A "wild card" takes the place of letters within a word and is an important way of catching variant spellings. For example, the American spelling is "color", the British spelling is "colour". To retrieve both spellings, user might search for "col*r" .

2.8.6. Field Searching

Each record in a database is composed of separate fields, which contain specific pieces of information. By looking for terms within a certain "field" such as language, year of publication, type of publication, user can limit or define their search more easily.

For example, if a database contains records for journal articles, chapters in books, and conference proceedings, and user ONLY want journal literature, user can limit their search to retrieve citations that refer strictly to journal articles. The specific commands user use will vary depending upon the software of the database user are searching. Take a look at the online help, one our printed users' guides, or ask one of the librarians in the reference area for assistance.

2.8.7. Proximity Locators

When using keyword searching, user can specify how near one term must be to another and in what order by using the following "proximity locators." These are especially useful when searching full-text databases. Three useful proximity locators are the following:

W/n Finds both search terms in the same document in any order, as long as each term appears within "n" words of the other ("n" is a number that user select).

For example: laser W/10 surgery

finds the word "laser" within 10 characters of the word "surgery"

PRE/n Finds both search terms in the same document but specifies that the first term occur before the second term.

For example: European PRE/2 Community

finds the word "European" 2 characters before the word "Community" .

2.9 Benefit of SWSS

All the system that develops must have its own purpose. Instead, all the developers developed their system for the purpose of helping user to maintenance their daily works. So every system have its own benefit. For this Smart Words Searching System, it have the following benefits:

- Easy to use by user in text problem

- Able to save their works
- User able to check grammar error
- User able to replace and correct the error
- Database dictionary that include the correct grammar to be referenced
- Easy interface operation

2.10 Weakness of SWSS

However, if there is a black, there must be a white. Every system also includes its own weakness and problem. No such thing as 100% true and false. For this system development, it has its own weakness which state as follow:

- No good looking interface
- Only able to edit text document, no graphic, image, animation, video and other medias editing
- Don't have many different function as others software like Microsoft Words
- Only able to search text in pages compare to other internet search engine

2.11 Problem Facing

There are a lot of problems arise while developing the system. Some of them are public problems and some private problems. All the problems can be solve according to their own solutions, as some of them are independent from others while some of them have to be link together to share solution or solve one after another. Not all the problem can be solve as some of them depends on exactly the right time, right place and right person. The problem been facing are stated as follow:

- Requirement for the system development

This requirement is a must. It can be any hardware and software requirement. To develop the system, a PC with everything which stated in the "Tools To Use" part must be prepare and after that, the development tools like the necessary software and platform must also be prepare before beginning anything about the development.

- Schedule of Development Time

  I must plan smoothly the exactly time to do some research, to study, to develop the system, to write the report, to rest and others. The schedule must not be crash with the time of studying and time of doing other courses projects. It is difficult to organize, as the time of all this events must be carried out at the same time.

- Understand the Development Tools

  I must understand more details about the development tools before can get on with it. For example, I must understand more about windows, database management, interface design and operation of the programming tools.

- The specification of the System

  I must understand more details about the system that I'm going to develop. What so special about my system? What is the function can be included in the system? Can my system be usable?

- Programming language background

  I must know how to use all the necessary tools and functions that provided by the programming language and the way of writing the language's code for the usable functions.

- Find similar system

  Some of the similar system in the market must be understand more details about their operation and usage before developed my system. It is because if the system been develop is the same as the existing system in the market, it makes no point to develop it. The system been developed must have more functions than the existing system.

- Backup plan

  If something happen in the middle of the development, for example the hardware which been used for development have been infected by unknown virus, hard disc failure or software failure, what are the backup plan to be carried out to solve the problems?

Schedule of System Development

No	Task Name	May/01	June/01	July/01	August/01	Sep/01	Oct/01	Nov/01	Dec/01	Jan/02	Feb/02
1.	Literature Review										
2.	Methodology										
3.	System Design										
4.	System Implementation										
5.	System Testing										
6.	System Maintenances										

2.13 Summary

All this research can do in order to gain information to develop the project. Aspects commands in the research are system development strategies.

As the development strategies, the reason focus on the "WaterFall model" schedule refers to the System Development Life Cycle. Each model has its own features and advantages, which are all fro one another. There are no rules in use what method to develop the system. It depends on when they are use, how they are applying, and who is involved in the development process. The development method that has been chosen for this project will be discuss in the following chapter.

The information gatherings on the authoring tools are analyzed and these tools chosen for the project will be discuss later.

The comparisons were based on the existing system like the "search engine" and the "Find" function in Microsoft word. These are the most similar function which can be pick to compare and also as a example to develop the system.

The search methods are discussed in the middle of this chapter, as they are the methods that were mostly use in searching neither on web or in text.

The benefit and weakness were the result based on the comparison with the existing system in market that the "search engine" and the "Find" function in Microsoft word as stated above.

That summarizes the Literature Review for this project. And the information obtained will be used efficiently for the development for this project.

Chapter 3
Methodology

3.1 WaterFall Model

Most of the systems designed have their own methodology for the purpose of succeeding their design. The methodology use as a reference step-by-step preparation for understanding "What should do next".

As for myself, I use the Methodology, which name as 'WaterFall Model'. This methodology that I use in Smart Words-Searching System can be dividing into five major steps, that each of them have their function, procedure and even own preparation.

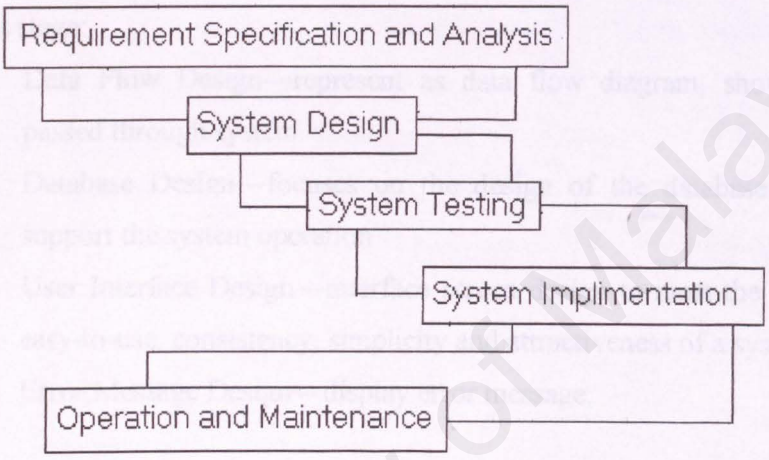


Figure 7: WaterFall Model

3.1.1 Requirement Specification and Analysis

In this stage, the requirement for the "to be development software" are established It define functional capability, performance, system interface and design constraints. It provided the software designer with representation of information and function that can be translated to data, architecture and procedure design.

In this stage:

- Information gathering—done using written material such as book, magazine, Surfing, lecturer discussion for update information.
- Requirement Specification—structured documents that set out the system services

  In details is determine, which included functional and non-functional request.

- Development Language and tools—development the system.
- Runtime requirement for system are determined.

3.1.2 System Designed

In this stage, the established requirements are identified as software or hardware. The software is then translated into a representation of software that can be accessed for quality before coding begins. Two phase of software design are:

- Preliminary Design—transformed requests into architectures
- Details design—refined the product of Preliminary Design into details data structures and algorithmic representations.

In this stage:

1. Data Flow Design—represent as data flow diagram; show how data passed through system.
2. Database Design—focuses on the design of the database model that support the system operation
3. User Interface Design—interface screen design to meet the objective of easy-to-use, consistency, simplicity and attractiveness of a system.
4. Error Message Design—display error message.

3.1.3 System Implementation

For this stage, computed program are created. The design must be translated into a machine-readable form. The coding step performs this task. Coding involved translating a detailed design representation of software into a program language realization. Coding Methodology, coding style, coding tools will be studied carefully.

3.1.4 System Testing

Each program is calling a unit, and unit testing is the verification that every unit meets its specification. All the unit are combined and now the whole are tested. When it is successfully tested, the product is finished. Testing is exercising the software to uncover errors and ensure the system meets defined requirements

- Testing—few types of testing is perform during this phase.

3.1.5 Operation and Maintenance

Most system products include this step, as this is the final step for the WaterFall methodology. In this final point, all kinds of error, weakness, problem, correction and insufficiency is traced and identified. Software maintains reapplies of the preceding life-cycle step to an existing program rather than a new one.

3.2 System Analyst

3.2.1 Overview

System analyst is a systematic approach to identify problem, opportunities and objective and analyzing the information flows in system. System analyst examines all aspects of the system including the equipment, people, operating coordination and its internal and external demands in order to establish a basic for designing and implementing a better system. The role of the system analyst can be referred from the step in the system development life cycle.

The purposes of this phase are:

1. To identify the user's need.
2. To evaluate the system concepts for feasibility.
3. To allocate function to hardware and software, people, database and other system elements.
4. To establish time and schedule constraints.

3.2.2 Approach

A development method must be chosen to develop the system to make it successfully. There is no right way to develop project or system. Some method may be more successful than others depending on when they are use, where the to be applied, how they apply, and who involved in the development process.

It is important to have these strategies, as it will help developer to organize the project. Every system development needs user to determine the requirement. A requirement is a feature new system should have, both the information the system

should have procedure and opportunity feature such as processing control producing information, controlling a business activity, supporting the management, response time and input and output with. The determination of requirement this entails studying the existing system and collecting details about it to find out what this requirement are. There are four main things, which requirement about a system can be obtained and they are reading, interviewing, observation, and questionnaire.

After analyzing these opportunities, the WaterFall Model was chosen as the methodology for this project.

3.3 Information Gathering

The first step of the system analyst are gathering the important information need in the development of the system. There are many methods of gathering information that can be used and they are:

- Reading materials from books and internet article
- Conducting interview and discussion
- Pass year thesis

3.3.1 Reading materials from books and internet article

It is the main materials use to gathering the information of the Smart Word-Searching System. Apart from that, the Internet was searching from time-to-time to gather information on currently available needs on web and to observe the formats and style of the Smart Word-searching System. The Internet also helps in gathering the knowledge of such information. The entire information site, which refer to the web sites and books were state in the references at the end of this book.

3.3.2 Conducting interview and discussion

To better understand the field of Smart Word-Searching System and the user's request of the system, an interview was conducted. For an interview to be success and accomplish its objective, it has to be well planned. That it should include five steps, which are:

- Read background materials
- Establish interviewing objective
- Decide the people to be interview
- Prepare the people to be interview
- Decide the question type and structure

  The step and the result that get form this step were stated just a page before this page.

3.3.3 Pass year thesis

The pass year thesis can be found in the document room. All the thesis can be set as reference to study about the skills, structure, procedures of development and others relevant information that have done from our senior. Some information about SWSS can be found at this place, as there were few theses about the current search engine like "Lycos", "Inforseek" and others that may be as references for the development of SWSS in the next semester.

3.4 System Requirement

It is necessary to draw out the system request to provide a guideline for developing the system. A request is a feature of the system or a description of something the system is capable of doing in order to fulfill the system purpose.

The system request for this project can be determined for the Smart Word-Searching System module, which are the public user module. The type of the request for a project is normally separate into the functional request and non-functional request.

3.4.1 Functional Requirement

A functional request describes an interactive between the system and its environment. It is also describes how the system should behave given certain stimuli. It can be modules as follow:

- Public user module

  Basically all the function for the public user is under the information and search function whereby can search all the information we need.

- Concepts

  Apply the concepts in the project development using the selected tools.

- Media combination

  Create an interaction with combination of multimedia like image, graphics, audio, video and animation.

3.4.2 Non-functional request

A non-functional request can be describes as a restriction on the system that limits the choice for constructing a solution to the project. These solutions will narrow down the selection of programming language, platform or implementation technique tools.

Among the non-functional request are:

- Graphical user interface (GUI)

  The use of GUI for example, suitable and meaningful button will attract the attention of the uses and make it easier for them to interact with the system even with little or no computer background.

- User friendly

  Associated to the previous request, this function also allow user to operate the system with easy. Providing the necessary command does the situation. This system provides an effective error holding and validation procedure so that user can use this system easily. The system develops an error message or warning if an error occurs.

- Reliability

  It is the extends to which system can be expects to perform its intends function with requirement precision and accuracy.

- Usability

  It should be develop in the way easy to use. Users should be able to retrieve the information easily.

3.5 Development Requirement

Every development has its own suggestion of software and hardware requirement to use for the successful of the system. As for the development of the Smart Words Searching System, the requirement almost be the same others development. As results, the hardwares are as follow:

3.5.1 Hardware

- **A desktop PC**

  The basic hardware must be prepared for the development.

- **At least 32 RAM memory**

  For use as temporary storage to store the data been used.

- **At least 10Mb of hard disc space**

  As memory to store data and details after process been carried out.

- **Monitor**

  To display the interface been design and as area of viewing the text and graphics design.

- SVGA 640 x 480

  256 to 16 million colors need for multimedia package.

- **Printer**

  To print the report after the system been develop

- **Keyboard**

  Input devices for characters, numbers and symbols.

- **Mouse**

  Input devices to carry out operation like push button and text edit which much easier than use the keyboard

- **Diskettes**

  As backup storage if something happen to the hard disc.

- **Scanner**

  To scan some beautiful graphics as icon that could be include in the project development.

After the necessary hardware been prepared, we must consider the necessary software to develop the system. The software that can be used and platform are stated as follow:

3.5.2 Software

- **Operating system: windows 98**

  As platform to develop the system and to run the authoring tools which cannot be run under DOS platform.

- **Visual Basic 6**

  Programming language to design the system interface.

- **Microsoft Access 2000**

  Software to design the system database.

3.6 Benefit in Visual Basic 6

Everyone use different method and strategies to develop their project. One of the most famous software is using the Visual Basic to develop the project interface. Why people want to use such software, after research, there is some popular reason which stages as follow:

1. Visual Basic enables which search engine (JET engine 1.0) that comes from the family similar to the internal engine (JET2.0) of the DBMS use. Example is Microsoft Access. Both of them show the same database format and hence intermediate conversation program such as DDBC of required.

2. Furthermore, Visual Basic using event driven approach to program the system and have a procedure language. Applications develop with an event driven model respond to event that happen in the computer environment. Such event includes the pressing of the call from another application running concurrently.

3. Feature of Visual Basic include multiple-documents interacted (MDI). Objective linking and embedding (OLE) and dynamic data exchange (DDED).

4. Visual Basic is royalty for distribution model meaning that application written in this language can be distributed without having to pay more royalty fee to Microsoft Company.

As for the details, Microsoft Visual Basic has several new features, which state below:

- Working with multiple project

  You can create much application by working with single project. However, as your application become more complex, you may want to work with multiple projects in the same section of the programming environment. You can add a new or existing project to your current editing section by adding into a project group. You can then save the project group and work with it in subsequent editing section. You can open project group or an individual project in the project group, or add the project group or its individual project to another project group.

- Using condition compilation

  Condition compilation lets you selectively compile certain part of the program. You can include specific features of your program in different version, such as design an application to run in different platforms, or changing the date and currency display filters for an application distributed in several different language.

- Working with resource files

  A resource file allows you to collect all the version specific font and bitmap for an application in our place. This can include icon, screen text, and other materials that may change between localized versions or between revision and specific configuration.

- Working with template

  Visual Basic provides variety of templates for creating common application components. Rather than creating all the pieces of your application for scratch, you can customaries an existing template. You can also reuse custom components in multiple applications by creating your own template.

- Working with command line switch

  Command line switch provide a way to control hoe Visual Basic execute. Using command line switch, you can start an instance Visual Basic and run a specified project, make an executable file or dynamic link library, or specify a string to be passed to the command function.

- Compiling project to native code

  If you have the professional or enterprise version of Visual Basic, you can compile your code either in standard Visual Basic p-code format or in native code format. Native code compilations provide several options for optimizing and debugging that are not available with p-code.

- Creating own data type

  You can combine variables of several different types to create user-defined types (*struct* in C) user-defined are useful when you want to create a single variable that records several related pieces of information. You create user-defined type with the type statement, which must be placed in the Declaration section in a module.

3.6.1 In conclusion

3.6.1.1 Pros:

- Easy to learn and use
- Inexpensive
- Vast around of tutorial and support materials available in books, magazine and online.
- Application compiled to executable form, and there are no restrictions on distributions.

3.6.1.2 Cons:

- No hypertext capability.
- Poor at text handling.
- Required a lot of coding in a daunting programming language.

3.7 Planning

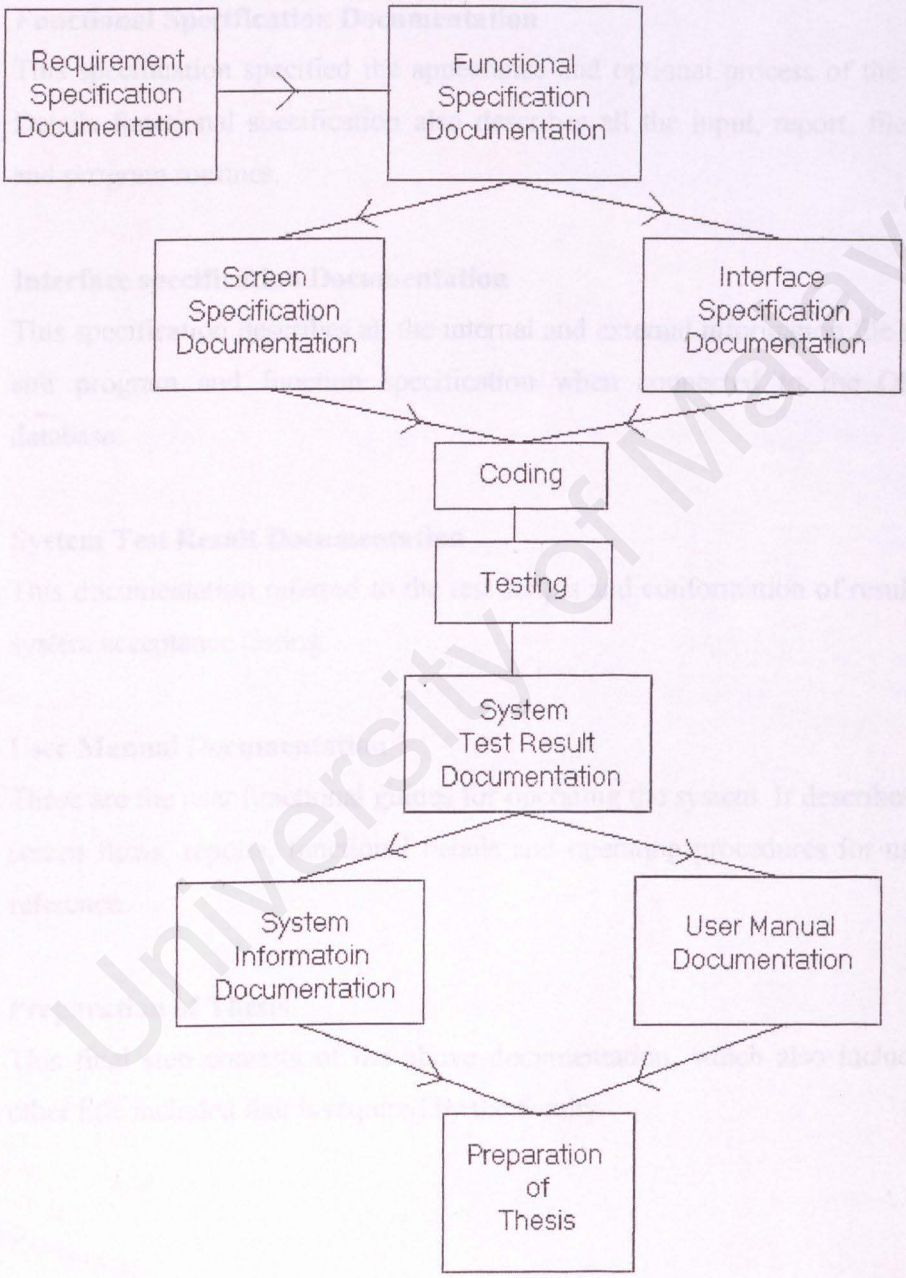


Figure 8: Project Plan

3.8 Planning Descriptions

a) **Requirement Specification Documentation**

This specification documents the user requirement to meet information visualization and operation flow to tailor the development.

b) **Functional Specification Documentation**

This specification specified the appearance and optional process of the system. Details functional specification also describes all the input, report, file format and program routines.

c) **Interface specification Documentation**

This specification describes all the internal and external information file strength and program and function specification when connected to the OLE and database.

d) **System Test Result Documentation**

This documentation referred to the test scripts and conformation of results from system acceptance testing.

e) **User Manual Documentation**

These are the user functional guides for operating the system. It describes all the screen flows, reports, functional details and operating procedures for user as a reference.

f) **Preparation of Thesis**

This final step consists of the above documentation, which also includes any other title included that is required by the faculty.

3.9 Development Approach

These phases development approach are used:

1st phase—First semester of the project

ID	Task Name	Start	End	Year 2001			
				May	June	July	August
1.	Choose Project Title and Planning	28/5	30/5				
2.	Research and Finding Information	1/6	16/8				
3.	Interview and Collect Information From People	10/6	16/8				
4.	Analyst Information and Procedures	15/6	19/8				
5.	Prepare the Documentation	20/6	26/8				
6.	VIVA and Propose Final Proposal	20/8					

Figure 9: 1st Phase of Development

This phase was take time during the first semester of Third Year in University. Begin with choose the project title, planning, research, analyst, literature and design the proposal and even prepare for VIVA presentation were done within the twelve weeks time before the semester holiday.

2nd phase –Holiday

ID	Task Name	Start	End	Year 2001	
				Sep	Oct
1.	Coding on All Screen that Involved	30/9			
2.	Implement the System Step by Step	1/10			
3.	Preparing Test Script	5/10			

Figure 10: 2nd Phase of Development

This phase was take time during the semester's break for about two to three weeks. During the break, I prepared the necessary coding, do some research on the coding, implement the system and prepare for the test script.

3rd phase—Second semester of the project

ID	Task Name	Start	End	Year 2001		Year 2002	
				Sep	Oct	Jan	Feb
1.	Testing Conducted on the Whole System	30/9	10/2				
2.	Prepare the User Manual	10/10	10/2				
3.	Prepare the Project Thesis	30/9	—				

Figure 11: 3rd Phase of Development

This was the phase that after the preparations of coding. I begin to test the results to make sure it meet the functions that been include. The user manual was prepared after the successful of testing and implementation. After everything has done so far, the final proposal will be prepared for the presentation.

Chapter 4

System Design

4.1 Overview of System Design

First of all, what is system design?

Well, it is the phase where the actual system is develops on all the information gathered from the previous phases. It is also mainly about creating the structure and architecture of the system.

Others definition show that design phase is the implementation of the analysis done on the previous phase and the building of the system's structure and architecture.

The system design is the results from the analysis from the system design requirement. The design can be divided to the design of the structure, architecture, database, user interface and the output of the required information even I do not pretend to use database design in SWSS.

The architecture of the system means the algorithm of the system coding. It is normally the basic design of the system. It produces a variety of system function and also operation that can support the user need.

These however are not the only design process that is important but the readability of the program structure are also important because a readable program means a much easier understanding and maintenance in the future is more accessible.

As mention above, the combination of the three important parts in system design will success the operation. To make use of the process, all the three part must not be carried out independence, they must be carried out side by side to make sure the operation of the three can come out the same result for the system development.

There are many issues involved in creating a design. For example:

- What is the best for the application?
- What is comfortable for the designer?
- What make sense for the overall architectures?

Thus, no one styles is the best fro every situation. We must understand and compare the new style and technique with the current methods.

4.2. System Structure Design

The system structure design can be shown as system models that contain the main idea in design the interface and the database. It can be easily show in cart. As a whole, there are 3 major modules in design the SWSS and they are as follow:

- ✓ Write
- ✓ Search
- ✓ Other functions

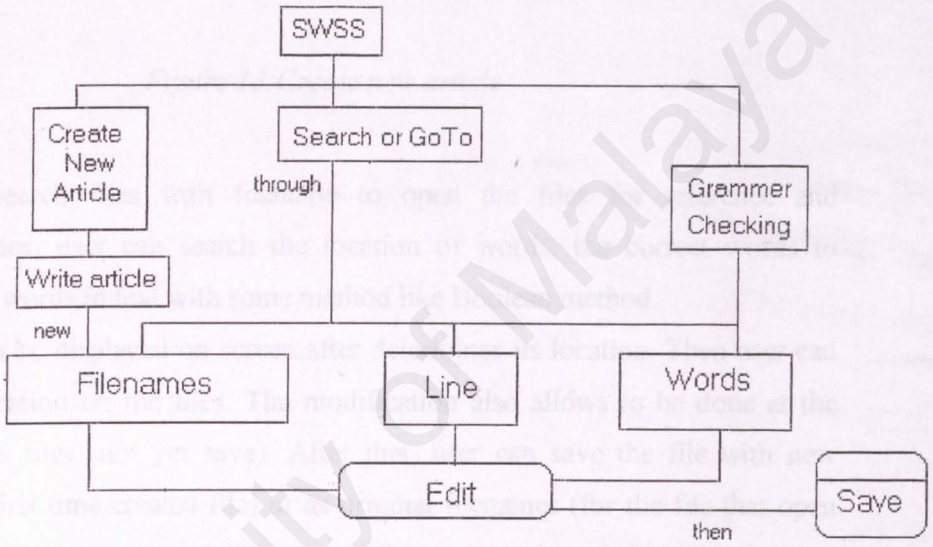


Figure 12: System Structure

SWSS-Smart Word-Searching System

From the figure 12 above:

4.2.1 Write or Create new

User create new article with new filename.

User can write their own text by created new blank file and writing some words, phrases, a whole paragraph, or few pagers then save the files with different filenames. The file can be used as future reference if the users want to make some edition or open the files.

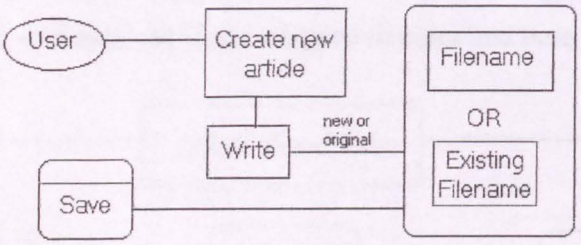


Figure 13:Create new article

4.2.2. Search

User can search files with filename to open the files for reference and modification. Besides, user can search the location of words, the correct words to replaces the invalid words in text with some method like Boolean method.

The file can be displayed on screen after determines its location. Then user can make some modification on the files. The modification also allows to be done at the current created new files (not yet save). After that, user can save the file with new filenames (for the first time created file) or as original filenames (for the file that open for edit). User can make use of function like count the total words and characters in text.

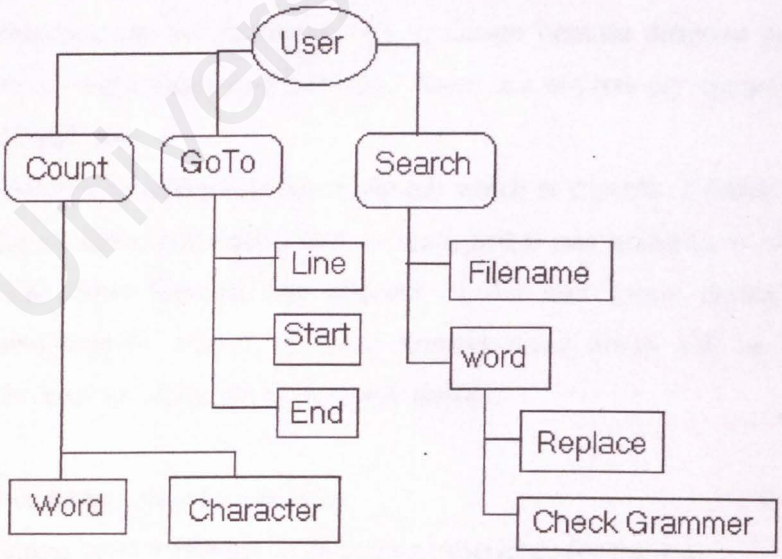


Figure14: Search Structure

4.2.3 Other Function

This part contains other small functions that are available to make the system more interesting. The functions are format for the page setup, font, text size and etc.

Besides, user also can insert image with color and time format.

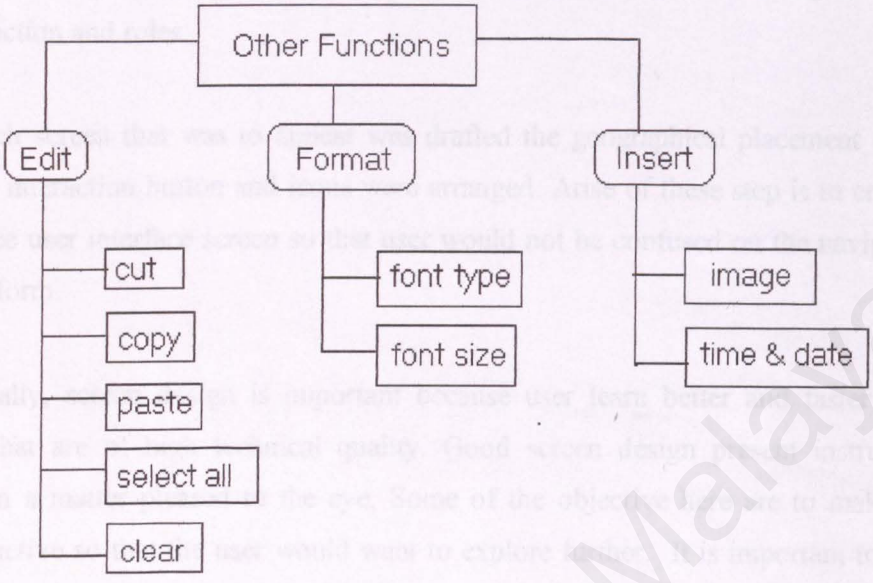


Figure15: Other functions

After either one or more of the above step had been done, user can save the file with new or original filenames and author's names.

4.3 System Interface Design

User interface can be flicking things to design because different people have different styles to understand and working. There are several lay elements that an interface should address.

A goal design interface is a screen design which is capable of fulfill the design and at the same efficient, consistent, easy to manageable and attractive to the user. In order to achieve these features, the respond of the user group clients be taken information consideration. Hence, all these features listed below will be taken into consideration in order to design the screen with quality.

- Attractive screen design to the user.
- Introduction should provide an appealing experience for the user.
- Easy to understand and high quality.

- Standard icon for the same task in every screen.
- Most the icon has "confirmation message" especially icon such as "Exit".
- "ToolTipText" for all the icons on the screen.
- The organization and representation of data, function, task and roles.
- Navigation rules for the models that mean the way move among the data, function and roles.

Each screen that was to appear was drafted the geographical placement of the navigation interaction button and icons were arranged. Arise of these step is to create a clutter. Free user interface screen so that user would not be confused on the navigation step to perform.

Finally, screen design is important because user learn better and faster from materials that are of high technical quality. Good screen design present instruction materials in a matter pleased to the eye. Some of the objective here are to make the screen attractive so that the user would want to explore further. It is important to help user gain access to the contents without loosing their comprehension as they move through information.

Chapter 5

System Implementation

5.1 Overview of Implementation

What is system implementation?

Implementation is the term that means to implement the systems that have been produced. A good system will be able to operate under any condition and will produce the result according to the user's will. It has been carrying out every time a part of system was completed.

SWSS was produced without using database and any complicated functions as the database can be link to the database of Microsoft Word which including grammar checking. Thus the user wish to use the SWSS must have Microsoft Word in their computer.

SWSS was produced according the usage as text editor and few functions were coding and linking to some functions that provided by Windows like the "SearchFile" and "OpenFile" functions.

The step of implementation only been carry out after the process of system design. There are four major step which must be consider:

A. Coding

Coding is the procedure of translates the logic interface of the system specification in the step of system design into instruction code in programming language.

B. **Testing**

This is the step that will be carrying out after the coding process to make sure the system will be produced the result according to the function that it suppose to do. The mistaken of coding and incomplete in coding can be discovering during this step so the correction can be made.

C. Accepted

For this step, there exist indirect communication between user and designer of the system. System designer will make sure the system been produced will meet

the user's need. The system will be adding or canceling some function according to the user's advised

D. Maintenance

This is the step where the system is using by the user. There is no guaranty that the system is free of mistakes and bugs as the user used the system in a long period of time. Thus the system will be update from time to time to reduce the bugs that been discover by user.

5.2 Problem Encounter

During the development of the system, some problems occur and slow down the development of the system.

A. Miss adding button

There are sometime that the button that have been add-in were not necessary for the system usage as the appearance of such function will not make the system improved in certain way. Thus it is important to have a good preview in mind what function should be included in the system before the coding.

B. Error in Coding

When the first time in coding, the most probably mistake will occur is the mistaken in coding the program for some of the function in the system. Thus made the function didn't provided the function that we expected. The message "Invalid function……" will appeared many times if the error didn't discovered and corrected. Sometime, the error may be just a simple line or may be a whole function, thus make the correction would not be as easy as expected. Every programming language has different way in correction. In Visual Basic, there is a way in corrected a simple error that been made, which designer may include a line 'Option Explicit' at the beginning of form coding.

For example, if Dimensional 'Counter' As Integer, is define at the beginning of the form coding. The designer mistaken write a word 'Countterr' in coding and

it is one and only one such word in form coding, the 'Option Explicit' will corrected it to 'Counter'.

C. Mistake in using function

Even there are many ways in coding for a single function of the button, but the better way should be choose. As some function just a few line that any way in coding doesn't matter but there is a better way in coding if the function covered many lines. It is because if error occurred within the function, the time and way to correct the problem always spin our head and eye if we were looking at a complex function.

For example, for system with option to choose, if it is a short and simple program, 'If……Else……Then' is useful, but it is better to use 'Select Case' for the longer and complex program.

D. Using the wrong programming language

Every programming language has few ways in coding which using the same word or phrase and also a few ways different in produced the same function. Thus made the programmer conflict if he or she has knowledge in more than one programming languages. Sometime adding a phase or ignore it would make the function work correctly while doing the same thing in other programming languages would produced an error.

For example:

If……..else (in C and C++ programming language)

If……...then……else (in Visual Basic)

E. Mistaken in linking function

When coding the programming, sometime may occur an event that we mistaken in linking the function to other function that it is not supposed to link. Thus pressing the function button would produce the result that supposed to do with pressing other buttons.

F. Problem in splitting the function

Some functions and procedures should be splinted into many for better interface and it is useful when come to mistake correction in coding. There is also sometime a function should not be spitted as would conflicted with other functions.

5.3 Examining the code

By the way, before the above procedure can be done, there was a step that very important which is examining the code. The process that known as "code review" is similar to the requirements and design reviews. Customers express requirements and approve the propose design; they are interested in implementation only when we can demonstrate the system as a whole works according to their description.

There are two type of code review:

- Code walkthrough
- Code inspections

5.3.1 Code walkthrough

In a walkthrough, we present the code and accompanying documentation for someone to comments on their correctness. During the walkthrough the discussion is made, which is informal and focus on code, not the coder. Although supervisory personnel may be present, the walkthrough has no influence on the performance appraisal, consists with the general intent of testing: finding fault, but not necessary fix them.

5.3.2 Code inspections

A code inspection is similar to code walkthrough but is more formal. In an inspection, we check the code and documentation against a prepared list of concerns. Comments from everyone can be comparing to the code to ensure that they are accurate and complete. Similarly, the interfaces among components can be checked for correctness. Inspection always involves several steps.

Firstly, an overview of the code and description of the inspection goals were made between several people and the designer. Then each inspector studies the code and

its related documents. Finally, everyone report what they have found, recording additional faults discovered in the process of discussing individuals finding.

As with walkthroughs, inspections criticize the code, not the coder, and the results are not reflected in a performance evaluation.

5.4 Success of code review

We may feel uncomfortable with the idea of someone examine our code. However, reviews have been shown to be extraordinarily successful at detecting faults and are often included in the step of developing a system. Remember that the earlier in the development process a fault is sported, the easier and less expensive it is to correct. It is better to find a problem at the components level than to wait until later in the testing cycle, when the sources of the problem may be far less clear. In fact, for this reason, we must inspecting early development artifacts, such as specifications and design, not just code.

5.5 Testing program components

Proving code correct is a goal to designer aspires: consequently, much related research is done to develop methods and automated tools.

5.5.1 Testing VS Proving

In proving a program correct, the programmer considers only the code and its input and output conditions. The program is viewed in term of the classes of data and condition described in the design. Thus the proof may not involve executing the code but rather understanding what is going on inside the program.

5.5.2 Choosing test cases

To test a component, we choose input data and conditions, allowed the component to manipulated the data, and observed the output. We select the input so that the output demonstrates something about the behavior of the code. A test point and test cases is a particular choice of input data to be used in testing a program. A test is a finite collection of test cases.

In order to convince users and ourselves that the program works correctly for all kinds of input, we begin with determining our test objectives. Then we select cases and define a test designed to meet a specific objective. One objective may be to demonstrate that all statement execute properly. Another way may be to show that every function performed by the code is done correctly. The objectives determined how we classify the input in order to choose our test cases.

We can review the code with all possible input and compare the output with what is expected according to the requirements or examine the code's internal logic, using a careful testing strategy. We use the test objective to help us separate the input into equivalence classes. That is, the classes should meet these criteria:

- Every possible input belongs to one of the classes. That is, the classes cover the entire set of input data.
- No input datum belongs to more than one class. That is, the classes are disjoint.
- If the executing code demonstrates a fault when a particular class member is used as input, then the same fault can be detected using any other member of the class as input. That is, any element of the class represents all elements of that class.

It is not always easy or feasible to tell if the third restriction on the classes can be met. We can be loosen the third requirement so that if a data element belongs to a class and reveals a fault, then the probability is high that every other element in that class will reveal the same fault.

5.5.3 Test thoroughness

To perform a test, we decide how to demonstrate in a convincing way that the test data exhibit all possible behaviors. To test code thoroughly, we can choose test cases using at least one of the several approaches based on the data manipulated by the code:

- Statement testing:

  Every statement in the component is executed at least once in some test.

- Branch testing:

  For every decision point in the code, each branch is chosen at least once in some test.

- Path testing:

  Every distinct path through the code is executed at least once I some test.

- Definition-use path testing:

  Every path from every definition of every variable to every use of that definition is exercised in some test.

- All-uses testing:

  The test set includes at least one path from every definition to every use that can be reached by that definition.

- All- predicate-uses/some-computational-uses testing:

  For every variable and every definition of that variable, a test include at least one path from the definition to every predicate use; if there are definition not covered by that description, then include computational uses so that every definition is covered.

- All-computational-uses/some-predicate-uses testing:

  For every variable and every definition of that variable, a test include at least one path from the definition to every computational use; if there are definition not covered by that description, then include predicate uses so that every definition is covered.

5.6 Conclusion

After the system analysis and design, the system must be implemented in order to produces a qualified system. There are many approaches and technique to developed a system, but the most important thing is that it must be planned and carried out systematically. In accordance with a overall strategy. The actual implementation of the system also required careful planning to ensure a smooth switchover. Testing of the system is also another important task in the process as it is validates the requirements to ensure that the system is functioning according to the requirements and specifications laid down. For more details about the system testing, please referred to the next chapter.

Chapter 6

System Testing

6.1 System Testing Overview

Many types of tests are done before the system can be release with confidence that it works properly.

Some tests depend on what is being tested:

- Components
- Group of components
- Subsystems
- Whole system

Other tests depend on what we want to know:

- Is the system working according to the design?
- The requirements?
- The expectations?

When testing the system, the testing process must control as a whole. First must create own test data, design own test cases, and then run the test properly. Once we are sure that the information is passed among components in accordance with the design, we test the system to assure that it has the desired functionality. A function test evaluates the system to determine if the function described by the requirements specification is actually performed by the integrated system. The result is a functioning system.

6.2 Principles of system testing

The main objective of system testing was to ensure that the code implemented the design properly: that is, that the programmer wrote code to do what the designers intended. In system testing, we have a very different objective: to ensure that the system does what the customer wants it to do.

6.3 System testing process

There are several steps in testing the system:

1. Function testing
2. Performance testing
3. Acceptance testing
4. Installation testing

6.3.1 Function testing

System testing begins with function testing. We need not know which components are being executed; rather we must know what the system is supposed to do. Thus, function testing is based on system's functional requirements.

Purpose and Roles

Each function can be associated with those system components that accomplish it. For some functions, the part may comprise the entire system. The set of associated with a function is call thread, so function testing is sometime called thread testing.

Logically, it should be easier to find the cause of a problem in a small set of components than in a large set. Thus ease of testing calls for choosing carefully the order in which functions are tested. Functions may be defined in the nearest manner. The requirements specification may treat change acknowledgements as one of the many functions of the overall system. However for testing, we may want to view the monitoring as for all functions that's relate. After that we test each one individually.

Effective function tests should have a high probability of detecting a fault. A test should:

- Have a high probability of detecting a fault
- Know the expected actions and output
- Test both valid and invalid input
- Never modify the system just to make testing easier
- Have stopping criteria

Function testing is performed in a carefully controlled situation. Moreover, since we are testing one function at a time, function testing can actually begin before the entire system is constructed.

Function testing compares the system's actual performance with its requirements, so the test cases for function testing are developed from the requirements documents.

Thus, for this system, examining the way in which the system handles can test SWSS:

- Document creation
- Document modification

Within each category, different functions are tested. For instanced, looking at the following can test document modification:

- Adding a character
- Adding a word
- Adding a paragraph
- Deleting a character
- Deleting a word
- Deleting a paragraph
- Changing the font
- Changing the font size
- Changing the paragraph formatting

and so on.

6.3.2 Performance testing

Once we determine that the system performs the functions required by the requirements, we turn to the way in which those functions are performed. Thus, functional testing addresses the functional requirements and performance testing addresses the nonfunctional requirements.

Purpose and Roles

System performance is measured against the performance objectives set by the user as expressed in the nonfunctional requirements. Performance testing examines how well the operation of the SWSS button will performed, the speed of response to user command, accuracy of the result, and accessibility of the data are checked against the user's performance prescriptions.

Types of Performance Tests

Performance testing is based on the requirements, so the types of tests are determined by the kinds of nonfunctional requirements specified.

- **Configuration tests** analyze the various software and hardware configurations specified in the requirements. Sometimes a system is built to serve a variety of users, and the system is really a spectrum of configurations. For instance, we may define a minimal system to serve a single user, and other configurations built on the minimal configurations to serve additional users. A configuration test evaluates all possible configurations to make sure that each satisfies the requirements. For SWSS, the configuration were not support multiple user, thus we may define only a minimal system to serve only single user.

- **Compatibility tests** are needed when a system interfaces with other systems. We find out whether the interface functions perform according to the requirements. For instance, if the system is to communicate with a database system to retrieve information, a compatibility test examines the speed and accuracy of data retrieval. For SWSS, it communicates with the database of Microsoft Word for the grammar checking and other window functions, thus a compatibility test is needed.

- **Timing tests** evaluate the requirements dealing with time to respond to a user and time to perform a function. If a transaction must take places within a specified time, the test performs that transaction and verifies that the requirements are met.

- **Quality tests** evaluate the system's reliability, maintainability, and availability. These tests include calculation of mean time to failure and mean time to repair, as well as average time to find and fix a fault. Quality tests are sometimes difficult to administer. For example, if a requirement specifies a long mean time between failures, it may be feasible to let the system run long enough to verify the required mean.

- **Recover tests** address responds to the presence of faults or to the loss of data, power, devices or services. We subject the system to a loss of system resources and see if it recovers properly.

- **Maintenance tests** address the need for diagnostic tools and procedures to help in finding the source of problems. We may require supplying some traces of transactions and other aids. We verify that the aids exist and that they function properly.

- **Documentation tests** ensure that we have written the required documents. Thus, if user manual are need we verify that it exist and that the information it contains is consistent, accurate, and easy to read.

- **Human factors tests** investigate requirements dealing with the user interface to the system. We examine display screens, messages, report format, and other aspects that may relate to ease of use. In addition, operator and user procedures are checked to see if they confirm to ease of use requirements. These tests are sometimes called **usability tests.**

Many of these tests are much more difficult to administer than the function tests. Requirements must be explicit and detailed, and requirements quality is often reflected in the ease of performance testing, unless a requirement is clear and testable.

6.3.3 Acceptance testing

When function and performance testing are complete, we are convinced that the system meets all requirements specified during the initial stages of software development. The next step is to ask the user if they concur.

Purpose and Roles

The purpose of acceptance testing is to enable the users to determine if the system we built really meets their needs and expectations. Thus acceptance tests are written, conducted, and evaluated by the users, with assistance from the developers only when the user requests an answer to a technical question. Usually, these users employees who were involved in requirements definition play a large part in acceptance testing, because they understand what kind of system the user intended to have built.

Types of Acceptance Tests

In SWSS, there are two ways the user can evaluate the system. They are the **Benchmark test** and **Pilot test**.

- **Benchmark test** are commonly used when a user has special requirements. We are asked to produce systems according to specification; one system will be chosen from purchase, based on the success of benchmark test. The user decides which one to purchase based on how the systems meet the benchmark criteria.

- **Pilot test** installs the system on an experimental basis. Users exercise the system as f it had been installed permanently. Pilot test rely on the everyday working of the system to test all functions. The user often prepares a suggested list of functions that each user tries to incorporate in typical daily procedures. However, a pilot test is much less formal and structured than a benchmark test.

Result of Acceptance Tests

The type of system being tested and the user's preferences determine the choice of acceptance test. Tests by users sometimes find places where the user's expectations as stated in the requirements do not match what we have implemented. In other words, acceptance testing is the user's chance to verify that what was wanted is what was built. If the user is satisfied, the system is then accepted as stated in the contract.

The acceptance test also allow user to determine what they really want, whether specified in the requirements documents or not. The user may not really know whether the problem indeed solved until they actually work with the system as proposed solution. In fact, working with the system may help user to discover aspects of the problem of which they were not aware.

When building a system, there is sometimes a long lag between the initial specification and the first viewing of even part of the system. During this time, the user's need may change in some way. Thus, changes in requirements may be needed not only because they were specified improperly at the beginning of development, but also because the user may decide that the problem has changed and a different solution is needed.

After acceptance testing, the user tell us which requirements are not satisfied and which must be deleted, revised or added because of changing needed.

6.3.4 Installation Testing

The final step of testing involves installing the system at user sites. If acceptance testing has been performed on-sites, installation testing may not be needed. However, if acceptance testing condition were not the same as actual site conditions, additional testing is necessary. To begin installation testing, we configure the system to the user environment.

Installation tests require us to work with the user to determine what tests are needed on-site. Regression tests may be administered to verify that the system has been installed properly and works as it did when tested previously. The test cases assure the user that the system is complete and that all necessary files and devices are present. The

tests focus on two things: completeness of the installed system and verification of any functional and nonfunctional characteristics that may be affected by site condition.

When the user is satisfied with the results, testing is complete and the system is formally delivered.

6.4 Conclusion

As a designer, we should anticipate testing from the very beginning of the system life cycle.

During requirements analysis, we should think about system function that will capture state information and data that will help us find the root cause if the system fails.

During design, we should use fault-tree analysis, failure modes and effects analysis, and other techniques to help us avoid failures or moderate their effects.

During design and code reviews, we can build a safety case to convince us that our software is highly reliable and will lead to safe system.

And during testing, we can take great care to consider all possible test cases, to automate where appropriate, and to ensure that the design addresses all possible hazards.

Chapter 7
Conclusion

7.1 Conclusion

This chapter concludes the whole development of the SWSS from the beginning of system introduction to system testing. The entire steps are the summary of each chapter.

The SWSS is design for the user for the purpose of text editor, or it can be said that it is more based on some existing system like the Microsoft Word software. For the part, the system is design to use a different function to find the words or specific characters in text file. Overall, the final product has fulfilled the basic functional and non-functional requirements as specified in the chapter one.

However, as common for any project, there is room for improvements for the system. The interfaces is easy to understand, and can still add some functions to fulfilled the user's need to make it more attractive.

The Literature Review is based on existing system like the Ms Word stated above and other search engine like the 'Yahoo', 'Altavista' and 'Lycos'. . Before develop a system, a lot of research has to be carried out to gather information about the system itself, the procedures as well as the methodology involved in development the system. All these information can be obtained from various sources. . The results of this research in Literature Review have set a foreground for the development of this system.

Most of the systems designed have their own methodology for the purpose of succeeding their design. The Methodology that I use was 'WaterFall Model'. This methodology that use in SWSS can be dividing into five major steps, that each of them have their function, procedure and even own preparation.

System analyst examines all aspects of the system including the equipment, people, operating coordination and its internal and external demands in order to establish a basic for designing and implementing a better system.

It is important to have the strategies in helping to organize the project. Every system development needs user to determine the requirement. A requirement is a feature

new system should have, both the information the system should have procedure and opportunity feature such as processing control producing information, controlling a business activity, supporting the management, response time and input and output with. The determination of requirement this entails studying the existing system and collecting details about it to find out what this requirement are. There are four main things, which requirement about a system can be obtained and they are reading, interviewing, observation, and questionnaire.

The first step of the system analyst are gathering the important information need in the development of the system. There are many methods of gathering information that can be used.

It is necessary to draw out the system requirements to provide a guideline for developing the system. The system request for this project is normally separate into the functional request and non-functional request.

The system design is the results from the analysis from the system design requirement. The design of SWSS can be divided to the design of the structure, architecture, user interface and the output of the required information. To make use of the process, all the part of the system design must not be carried out independence, they must be carried out side by side to make sure the operation come out the same result for the system development.

. A good system will produce the result according to the user's will. It has been carrying out every time a part of system was completed. The step of implementation only been carry out after the process of system design.

There was an important step, which is examining the code. The process that known as "code review" is similar to the requirements and design reviews. We may feel uncomfortable with the idea of someone examine our code. However, reviews have been shown to be extraordinarily successful at detecting faults and are often included in the step of developing a system.

Testing of the system is also another important task in the process as it is validates the requirements to ensure that the system is functioning according to the requirements and specifications laid down. A function test evaluates the system to determine if the function is actually performed by the integrated system. The result is a functioning system.

Development of the system is a very good experience in designing and developing a system for real usage. During the development, we may encountered many problem, but at the same time also absorb many novel concepts, theory and skills, which will be of great use in the future.

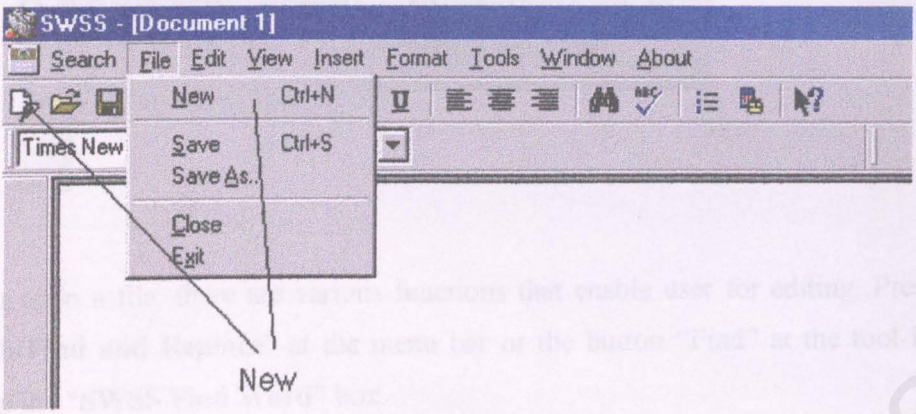
Appendix

-User Manual
-References

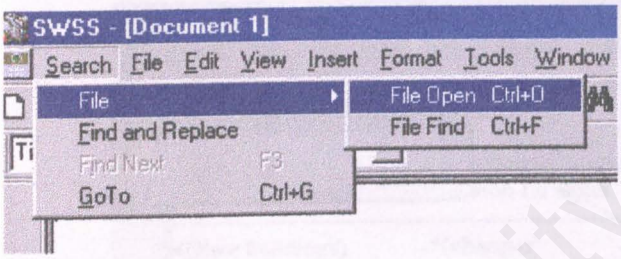
User Manual

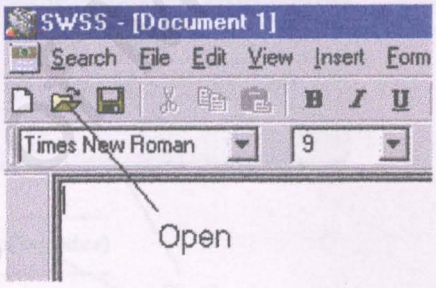
User Manual

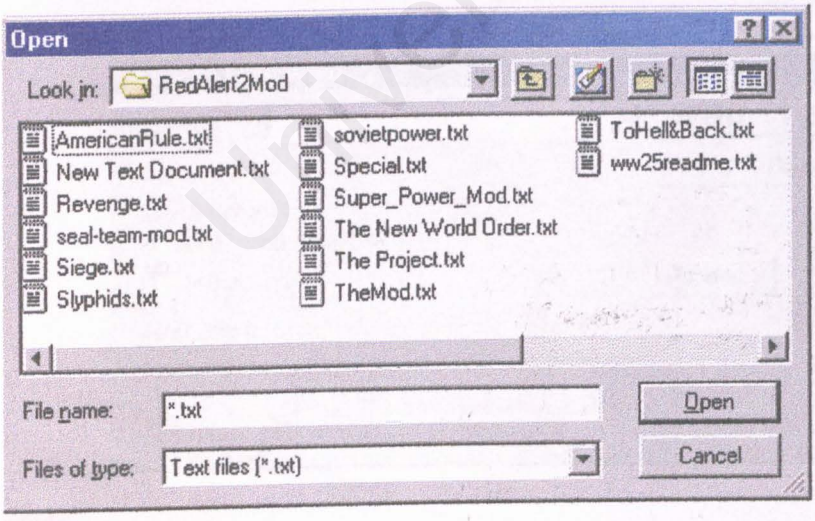
1. Create a new and blank document with pressing the "**New**" button or select "**New**" from the menu bar "**File**"



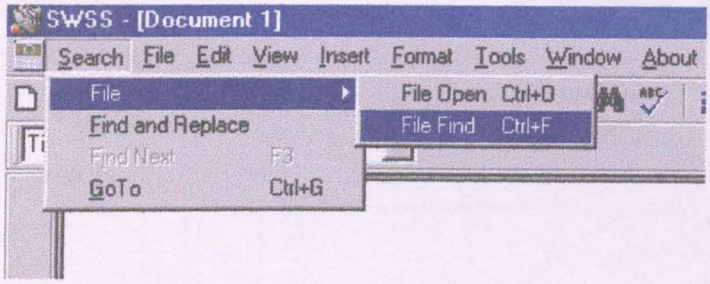
2. Open document for editing with select the menu bar "**Search-File-File Open**" or pressing the second button "**Open**".





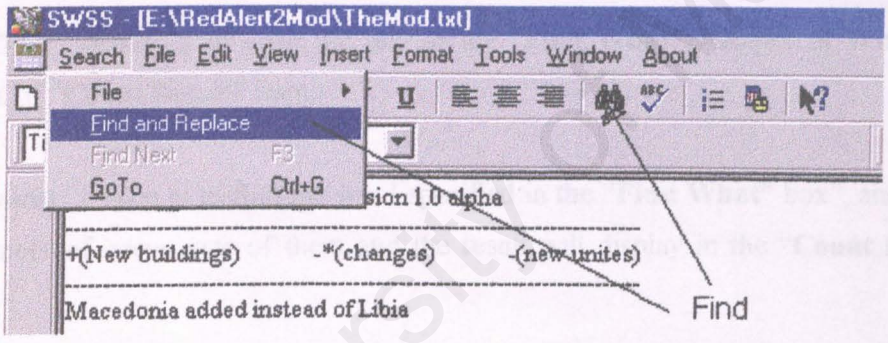


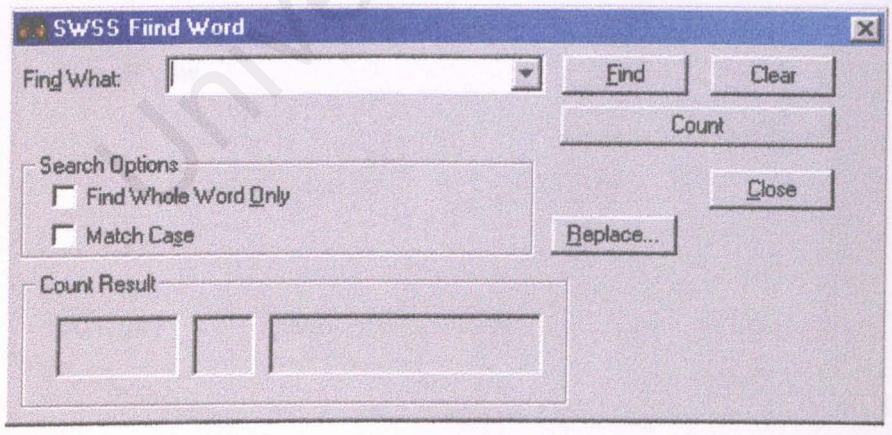
3. Search a file with select the "**Search-File-FielFind**" from the menu bar.

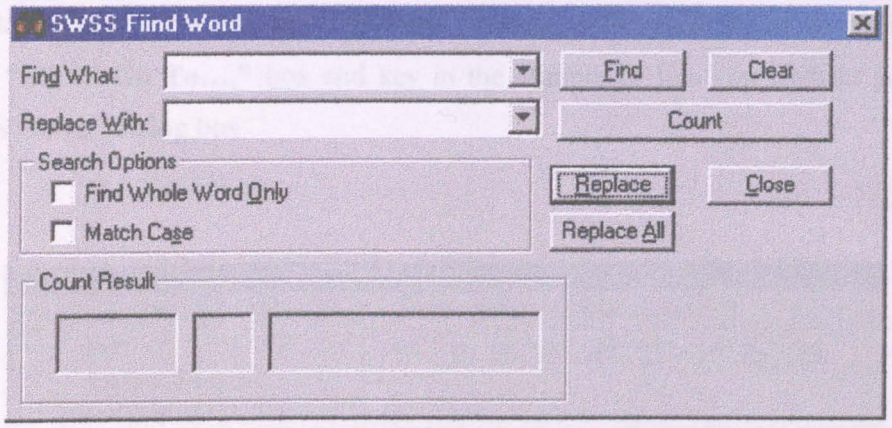


4. After open a file, there are various functions that enable user for editing. Press the "**Search-Find and Replace**" at the menu bar or the button "Find" at the tool bar to bring up the "**SWSS Find Word**" box.

Find and replace words or characters with fill in the "**Find What**" box and to be replaces in the "**Replaces With**" box after pressing the "**Replace**" button







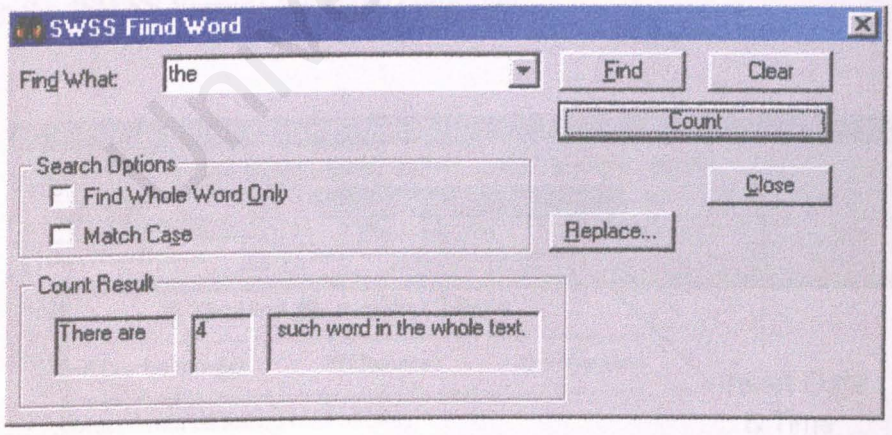
There are two options to be choose:

i) **Find Whole Word Only**—search exactly the same word or character that type in "Find What" box and ignore upper and lower case.

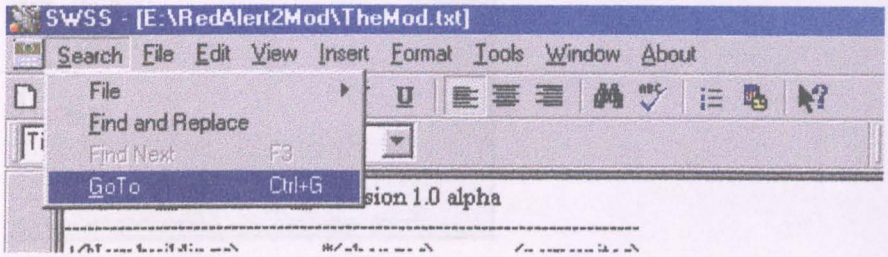
ii) **Match Case**—search word or part of the word that have the same order of character as the one type in "Find What" box without ignore upper and lower case.

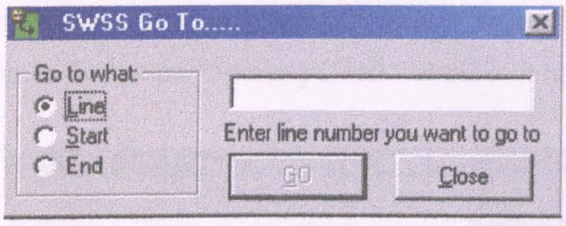
The "**Clear**" button is to clear the text in the "**Find What**", "**Replaces With**" and contents of "**Count Result**" frame.

The "**Count**" button is to find the word specified in the "**Find What"** box", and count the number of occurrence of them and the result will display in the "**Count Result**" frame.



5. Go to the line of the text with pressing "**Search-GoTo**" from the menu bar to bring up the "**SWSS Go To....**" box and key in the number of line you wish to go in the "**SWSS GoTo**" dialog box.





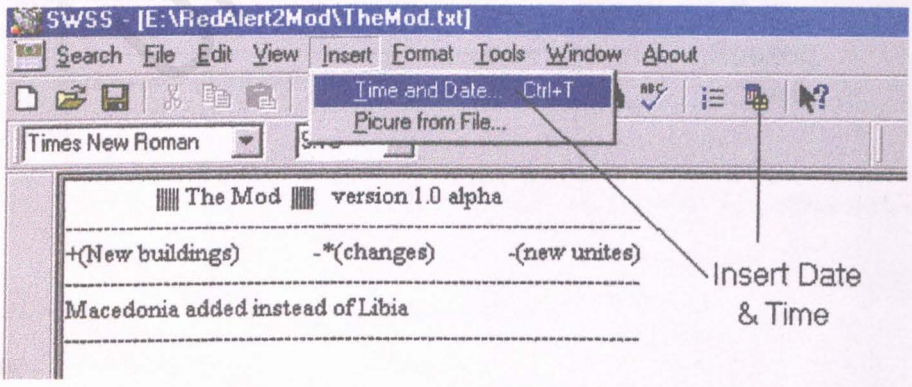
There are three options to be choose:

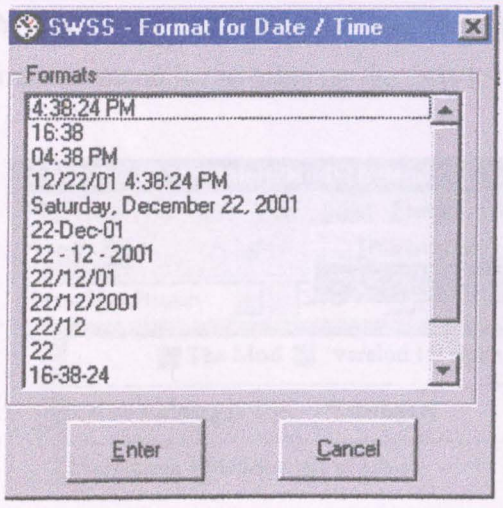
i) **Line**—number of line to go to.

ii) **Start**—start of text (first line).

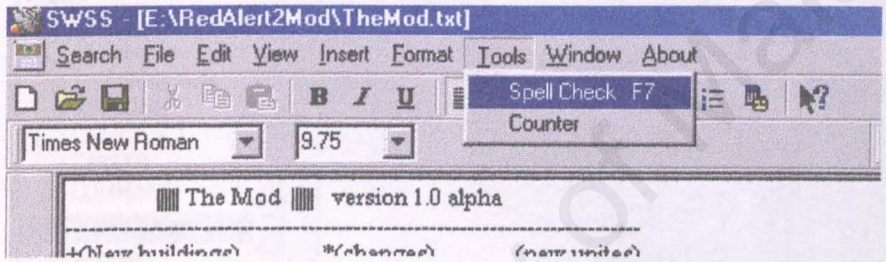
iii) **End**—end of text (last line).

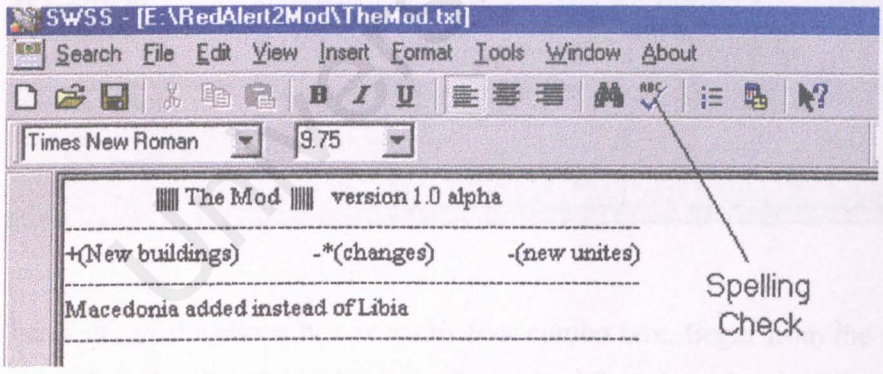
6. User may insert time and date according to the standard format with pressing "**Insert-Time and Date**" from the menu bar or the button "**Insert Date/Time**" on the tool bar to bring up the "**SWSS Format for Date/Time**" box.



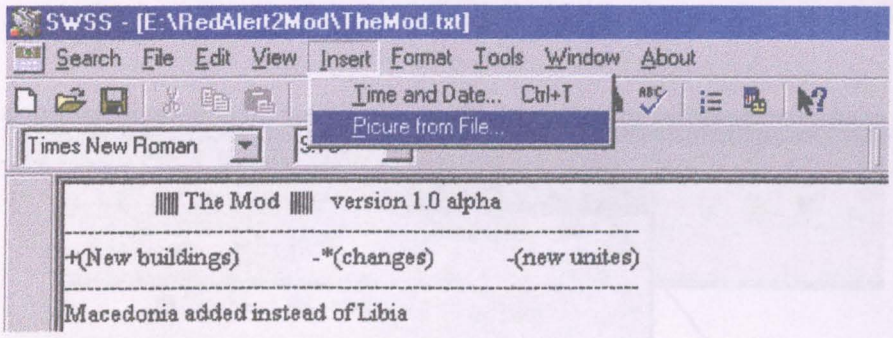


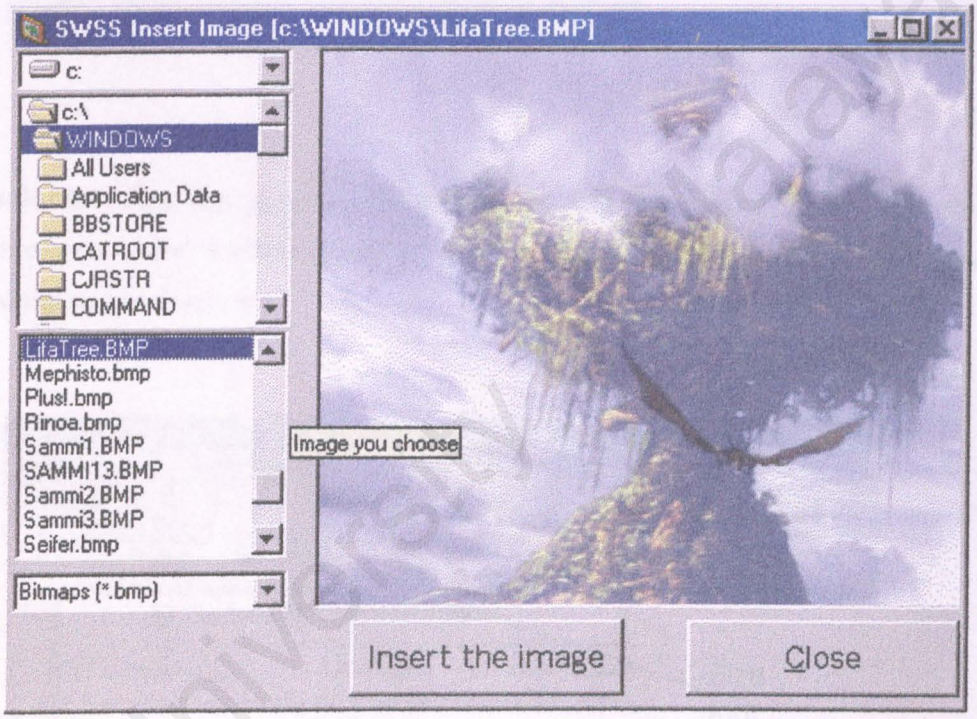
7. User can check the text grammars with pressing the "**Tools-Spell Check**" from the menu bar or the button "Spelling Check" at the tool bar.





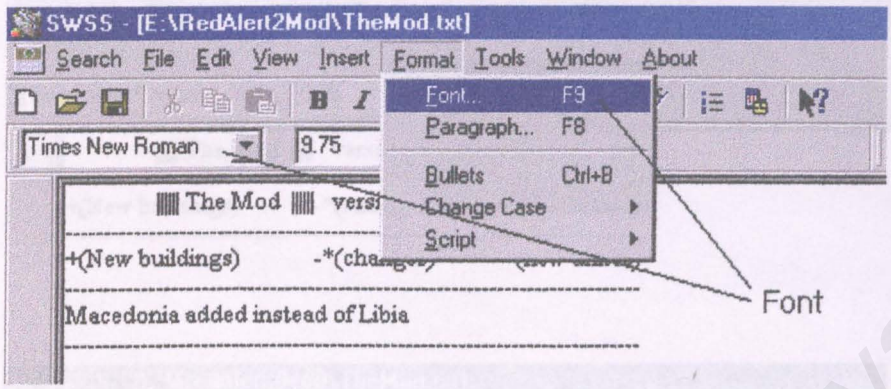
8. User may insert some image to the text file with pressing "**Insert-Picture From File**" from the menu bar to bring up the "**SWSS Insert Image**" box.



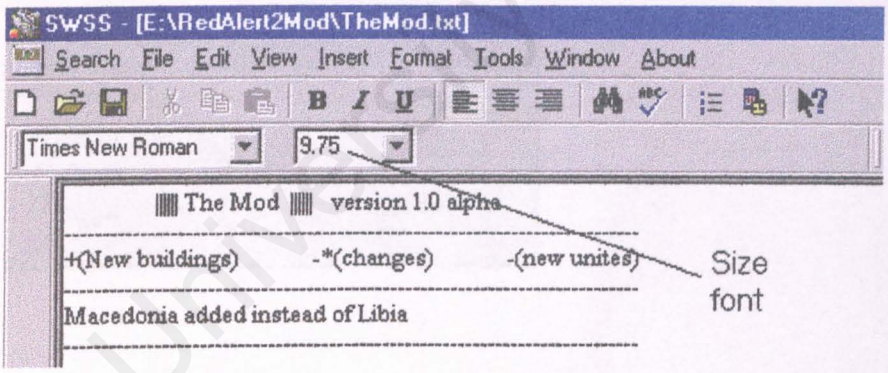


The left hand site of the above box contains four combo box. Begin from the top, the first one specified the directory, the second one specified the folders, the third one specified the images in the folder and the forth one specified the type of the image you wish to insert into the text. After that, pressing the button" Insert the image" will directly load the specified image into the text file.

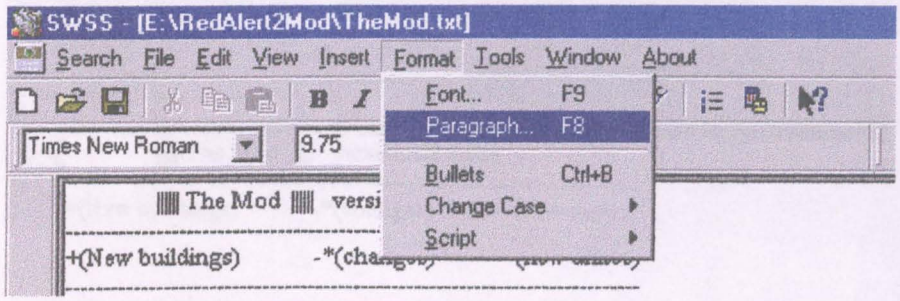
9. User may specified the type of font for the text file with pressing the "**Format-Font**" at the menu bar or directly specified from the comb box at the left hand site under the tool bar.

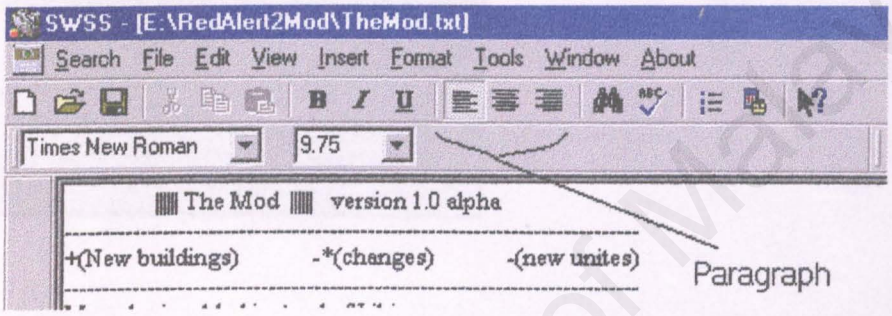


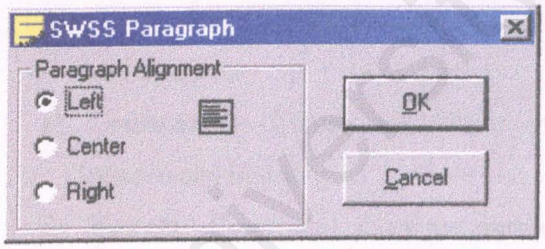
10. Beside, user also may specified the size of the font with directly select from the combo box next to the "**Format-Font**" combo box. User can select the provided size or specified the size themselves.



11. User can also change the type of paragraph format by pressing "**Format—Paragraph**" from the menu bar to bring up the "**SWSS Paragraph**" box or pressing the either three buttons at the tool bar.







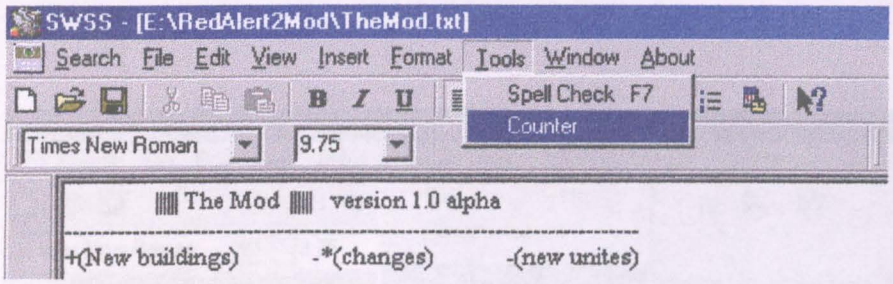
There are three functions to be choose:

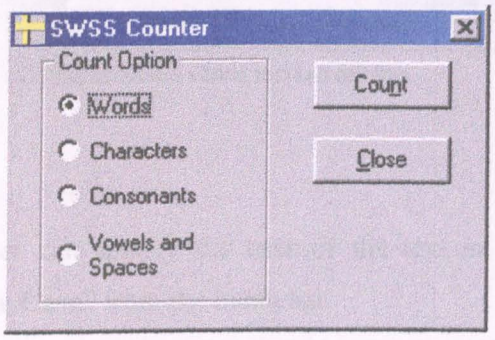
a) **Left**—All the text concentrate to the left site of the text

b) **Center**—All the text concentrate to the center of the text

c) **Right**—All the text concentrate to the left site of the text

12. User can count the number of words, character and others in text with pressing the "**Tools-Counter**" from the menu bar to bring up the "**SWSS Counter**" box.





There are few different functions to be selected by the user.

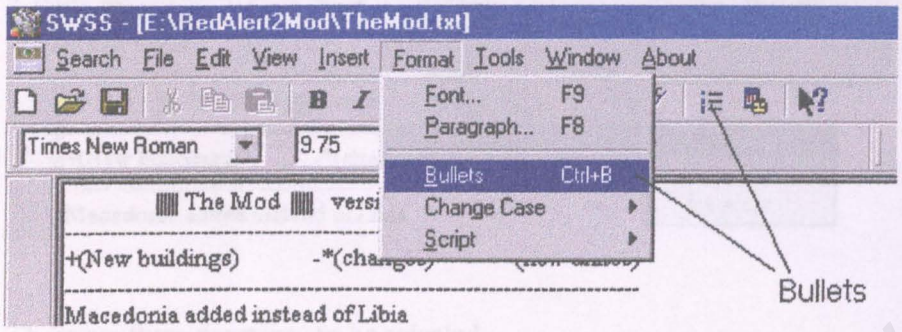
a) **Words**—Count the total words in text

b) **Characters**—Count the total characters in text (include spaces, symbols and string)

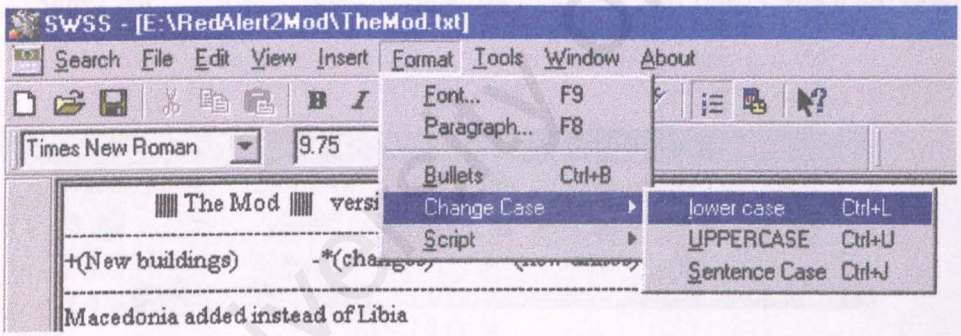
c) **Consonants**—Count and show the number occurrence of every consonants in text

d) **Vowels**—Count and show the number occurrence of every vowels and spaces in text

13. SWSS include the 'bullet' function to be choosing into the text to use as point for details. User can pressing "**Format—Bullets**" or pressing the "**Bullets**" button at the tool bar.



14. User can specify the case of the text in the text file with pressing "**Format—Change Case**" from the menu bar.



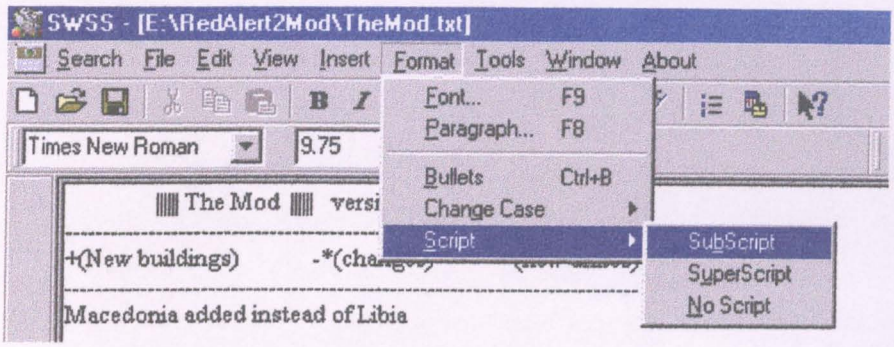
There are three functions to be choosing:

a) **Lowercase**—The character specified will change to lower case

b) **Uppercase**—The character specified will change to upper case

c) **Sentence case**— The selected sentence will change to upper case for the first character of the sentence

15. SWSS also include subscript and superscript functions to be selected. User may find them by pressing the "**Format—Script**" from the menu bar.



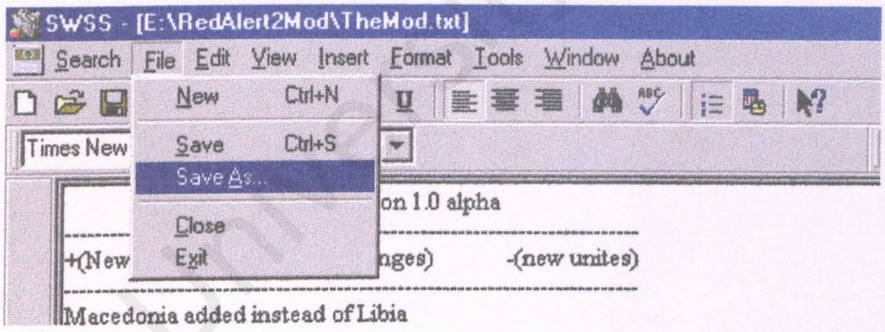
There are three functions to be selected:

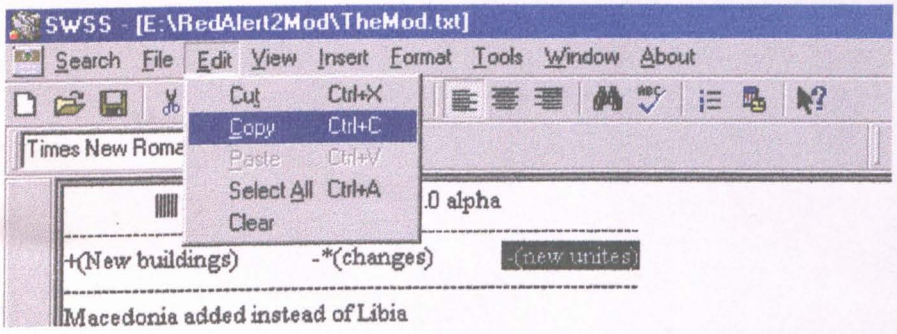
a) Subscript—example: 29_3

b) Superscript—example: 29^3

c) No script—example: 293

16. There are few other functions that I include in the system like "Cut", "Copy", "Paste", "Select All", "Clear", "Save", "Save As", "Close" and others which are easy to use.





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